## REMARKS

Claims 1 – 13 are pending in the present application. No claims have been amended, added or cancelled leaving Claims 1 – 13 for consideration upon entry of the present amendment. Applicants respectfully request a withdrawal of the rejections and an allowance of the claims.

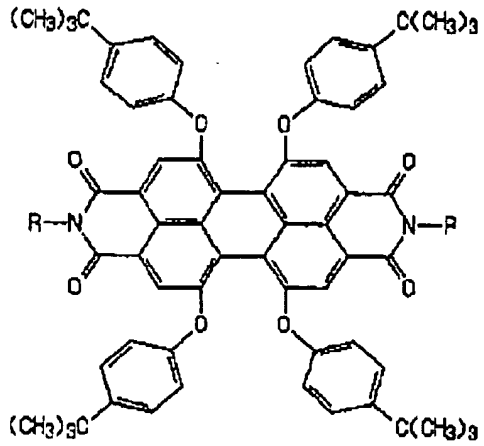
Claims Rejected Under 35 U.S.C. 103

Claims 1 – 13 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 5,122,306 to Van Moer et al. (Van Moer) as evidenced by U.S. Patent 3,775,336 to Bollyky in view of U.S. Patent No. 4,845,223 to Seybold et al. (Seybold). (Office Action dated 05/04/2005, page 2)

In making the rejection, the Examiner has stated that "[A]t the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the perylene compound of Seybold et al. with the chemiluminescent composition of Moer et al. The motivation to do so would have been its ready solubility in organic solvents". (Office Action dated 05/04/2005, page 3)

The present application is directed to and claims a chemiluminescent composition emitting red light comprising a solvent, an oxalate compound and a perylene compound represented by the following formula 2:

<formula 2>




in which, R is a $C_{12}$-$C_{20}$ alkyl group, wherein the perylene compound is present in the

composition in an amount of 0.1 to 0.5 % by weight, based on the total composition.

Van Moer teaches derivatives of anthracene for the emission of a blue chemiluminescent light. (see Abstract) Van Moer teaches that the derivatives of anthracene can be used in a solvent or oxalate. (Col. 4, line 28) Van Moer teaches that to cause chemiluminescence it is preferable to used a 20 – 40:1 oxalate to fluorescer molar ratio. (Col. 4, lines 40 – 43) Van Moer further teaches that peroxides can also be used. (Col. 4, line 50)

Van Moer does not however teach the use of a perylene compound having the structure depicted in Formula (2) of the present application. Further, Van Moer teaches the use of the anthracene derivatives in either a solvent or an oxalate. Contrary to the Examiner's contention, Van Moer does not teach a combination of solvents with oxalates, as is presently claimed. Van Moer in Col. 4, lines 29 – 32, does provide a list of solvents, but does not provide any direction as to which other fluorescers may be soluble in these solvents. More specifically Van Moer does not give any indication that any other fluorescers other than the substituted anthracenes are soluble in these solvents.

Bollyky teaches electronegatively substituted carboxyphenyl oxalates which are reactive with hydrogen peroxide in the presence of a solvent and a fluorescer to produce visible chemiluminescent light. (See Title and Abstract) Bollyky teaches that prior to its invention, at high oxylate concentrations, high light capacities are impossible. (Col. 2, lines 31 – 33) Bollyky therefore shows that for carboxy substituted oxalates, high oxalate concentrations can be used while obtaining high light capacities. Bollyky therefore in Table III teaches that the molar ratio of the carboxy substituted oxalates to the fluorescer is higher than the preferred ratio of 40:1 prescribed by Van Moer. For example, in Experiment 1, the molar ratio of the carboxy substituted oxalates to the fluorescer is 42, while in Experiment 3, it is greater than 85. Bollyky therefore teaches away from Van Moer. One of ordinary skill in the art would therefore not have combined Van Moer with Bollyky in the manner undertaken by the Examiner.

Seybold teaches novel fluorescent aryloxy substituted perylene-3,4,9,10 tetracarboxylic acid diimides. (see Title and Abstract) Seybold, in Col. 7, line 35 teaches that they are readily soluble in organic solvents, which the Examiner has cited

as motivation for combining references. Seybold does not however, mention which solvents the novel fluorescent aryloxy substituted perylene-3,4,9,10 tetracarboxylic acid diimides would be soluble in and which solvents it would not be soluble in. In addition, Seybold teaches C1 - C18 alkyl radicals while the current application is directed to C12 - C20 alkyl radicals.

In the first instance, Applicants disagree with the Examiner's contention that Seybold's teaching of solubility can serve as the motivational basis for combining Seybold with Van Moer. Despite Seybold's teaching in Col. 7, line 35, one of ordinary skill in the art would be reasonably aware that solubility varies from one compound to another. Thus Van Moer's indication of solubility for its substituted anthracenes in its list of solvents would not automatically translate into the claimed perylenes being soluble in the same list of solvents. For example, Applicants hereby submit U. S. Patent No. 4,882,254 to Loutfy et al. (hereinafter Loutfy), which provides a list of non-solubilizing solvents for perylenes. As can be seen from the list provided in Col. 6, lines 16 - 26, a large number of the non-solubilizing solvents are organic solvents. Thus the Examiner's contention that the perylene compounds of Seybold are readily soluble in all organic solvents is inaccurate and one of ordinary skill in the art would have to resort to experimentation (or solubility calculations using solubility parameters) in order to determine an appropriate organic solvent for the presently claimed substituted perylenes. Further, since the substituted perylenes are not soluble in all organic solvents, one of ordinary skill in the art would not (upon reading Seybold and Van Moer) automatically have substituted the perylene compound of Seybold in the chemiluminescent composition of Van Moer.

Further proof of the inconsistency of Seybold's statement and the Examiner's reliance upon this statement for motivation can be seen in the Examples of the present application, where the comparative Example (labeled Comparison 1) comprises N,N'-dibutyl-1,6,7,12-tetrakis (4-t-butylphenoxy)-3,4,9,10-perylenetetracarboxdiimide. Dibutyl phthalate was used as the solvent. The results shown in Tables 1, 2, or 3, clearly demonstrate that when the alkyl group in the perylene compound was a dioctadecyl, a didodecyl or a dihexadecyl, (i.e., having greater than 12 carbon atoms) the light intensity was significantly higher than when the alkyl group was a butyl (i.e.,

having less than 12 carbon atoms). Thus the perylene compounds containing the C1 – C18 radicals disclosed by Seybold are clearly not as effective in producing chemiluminescence as the currently claimed perylene compounds containing C12 – C20 alkyl radicals. These results are clearly unexpected and are not taught or suggested by either Van Moer, Bollyky or Seybold.

Thus, in summary, since there is no motivation to combine Van Moer with Bollyky and Seybold, the Examiner has not made a prima facie case of obviousness over Van Moer, Bollyky and Seybold. In addition, the unexpected results obtained when a perylene compound having alkyl groups comprising 12 – 20 carbon atoms are used in the claimed composition are not disclosed by any one of Van Moer, Bollyky and Seybold. Applicants respectfully request a withdrawal of the obviousness rejection over Van Moer, Bollyky and Seybold and an allowance of the claims.

Claims 1 – 13 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 4,751,616 to Smithey in view of Seybold. (Office Action dated 05/04/2005, page 3)

Smithey teaches a self-contained device for providing chemiluminescent light that contains a diluent solution of an oxalate, a fluorescer and a catalyst. (see Abstract). Typical diluents are listed in Col. 3, lines 22 – 32. Some of the diluents listed in this section are also listed in Loutfy as being non-solubilizers for perylene compounds. Thus clearly, one of skill in the art upon reading Smithey would find no motivation to combine it with Seybold in the manner undertaken by the Examiner. Since there is no motivation to combine Smithey with Seybold, the Examiner has not made a prima facie case of obviousness over Smithey in view of Seybold. Also in view of the unexpected results that are described above, Applicants respectfully request a withdrawal of the obviousness rejection over Smithey in view of Seybold and an allowance of the claims.

Claims 1 – 13 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 5,597,517 to Chopdekar (hereinafter Chopdekar 517) in view of Seybold. (Office Action dated 05/04/2005, page 4)

In making the rejection, the Examiner has stated that Chopdekar teaches a

chemiluminescent composition comprising solvents – dibutyl phthalate and dimethyl phthalate. (Office Action dated 05/04/2005, page 5) As discussed above, even in a solvent such as dibutyl phthalate, all perylene compounds do not perform satisfactorily in producing chemiluminescence. Thus, the claimed composition comprising a perylene compound having between 12 and 20 carbon atoms functions in a superior manner to those perylene compounds that have less than 12 carbon atoms. This result is neither taught nor suggested by either Chopdekar 597 or Seybold, and it is for this reason at least, that the Examiner has not made a prima facie case of obviousness over Chopdekar 597 in view of Seybold. Applicants therefore respectfully request a withdrawal of the obviousness rejection over Chopdekar 597 in view of Seybold and an allowance of the claims.

Claims 1 – 4, 6 – 9 and 11 - 13 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 5,705,103 to Chopdekar (hereinafter Chopdekar 103) in view of Seybold. (Office Action dated 05/04/2005, page 4)

As noted above, not all perylene fluorescers function equally well when blended with dibutyl phthalate and bis(2,4,5-trichloro-6-carbopentoxylphenyl)oxalate. Thus one of ordinary skill in the art upon reading Chopdekar 103 and Seybold would not be appraised of the fact that substituting the perylenes of Chopdekar 103 with those of Seybold would not necessarily lead to successful results that produce high chemiluminescence. As detailed above, the claimed composition comprising a perylene compound having between 12 and 20 carbon atoms produces superior chemiluminescence over those perylene compounds having less than 12 carbon atoms. This result is neither taught nor suggested by either Chopdekar 103 or Seybold, and it is for this reason at least, that the Examiner has not made a prima facie case of obviousness over Chopdekar 103 in view of Seybold. Applicants therefore respectfully request a withdrawal of the obviousness rejection over Chopdekar 103 in view of Seybold and an allowance of the claims.

It is believed that the foregoing remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this response or otherwise, please charge them to Deposit Account No. 06-1130 maintained by applicants' attorneys.

Respectfully submitted,

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